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NORTH AMERICAN AIR DEFENSE COMMAND

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WEEKLY INTELLIGENCE REVIEW (U)

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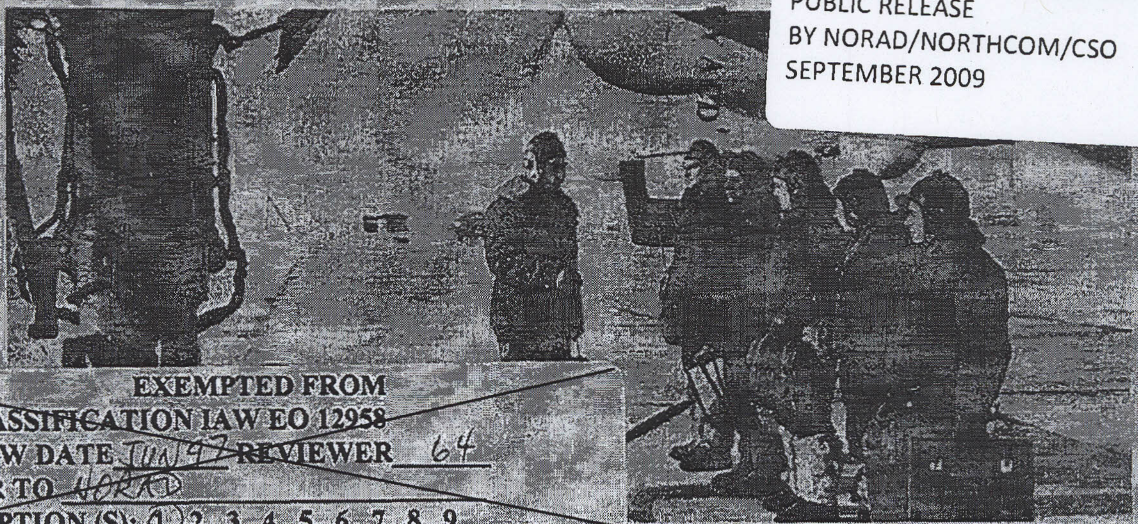

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WIR 13/65
26 Mar 1965

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NORAD Weekly Intelligence Review

Issue No. 13/65, 26 March 1965

The WIR in Brief

COVER: Soviet bomber crew (from Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 28, 29, 32, 33, 36, 37, 40, and 41 of this issue are blank.

Missile Range Firing Log

US radar detected the following Soviet space/missile launches during the period 2 February-16 March 1965:

Approximate Launch Time & Date	Type	Launch Site	Range
1100Z, 21 Feb	Cosmoses 54, 55, 56*	Tyuratam	Orbital
0731Z, 22 Feb	Cosmos 57#	Tyuratam	Orbital
0318Z, 26 Feb	SS-7 ICBM	Tyuratam	3400 n.m.
0501Z, 26 Feb	Cosmos 58##	Tyuratam	Orbital
0446Z, 04 Mar	SS-8 ICBM	Tyuratam	3400 n.m.
1104Z, 05 Mar	Unknown	Kapustin Yar	500 n.m.
0750Z, 06 Mar	SS-8 ICBM	Tyuratam	3400 n.m.
0900Z, 07 Mar	Cosmos 59#	Tyuratam	Orbital
0619Z, 10 Mar	SS-7 ICBM	Tyuratam	3400 n.m.
0926Z, 12 Mar	Cosmos 60#	Tyuratam	Orbital
0836Z, 18 Mar	Unknown	Kapustin Yar	500 n.m.
1100Z, 15 Mar	Cosmoses 61, 62, 63*	Tyuratam	Orbital
0632Z, 16 Mar	SS-4 MRBM	Kapustin Yar	1050 n.m.
0700Z, 18 Mar	Voskhod 2#	Tyuratam	Orbital

* Triple-payload launch by booster of unknown type, possibly SS-7 or SS-5.
\# Launched by SS-6 booster/sustainer system, injected into orbit by heavy Venik upper stage.
\## Launched by SS-6 booster/sustainer system, injected into orbit by light Lunik upper stage.

(Diyarbakir & Shemya RADINT)

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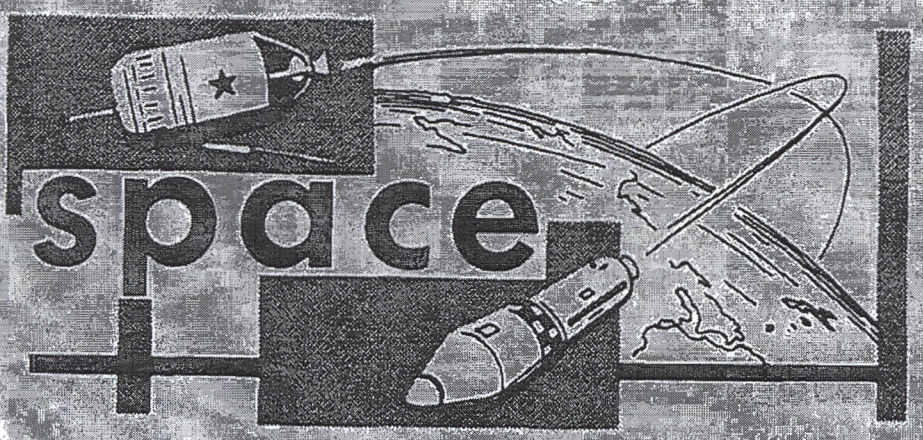

significant intelligence on space developments and trends

Space Listing and Over-all Space Status Report

The over-all space-vehicle status as of 1300Z, 22 March 1965 was as follows:

	US	UK	Canada	Italy	USSR	Total
Payloads in Earth orbit	124	2	1	1	21	149
Payloads in Sun orbit	7				5	12
Payloads in Earth-Moon orbit*					1	1
Payloads en route to Moon	1					1
Payloads impacted on Moon	4				1	5
Pieces of debris in Earth orbit	354	1	2		39	396
Pieces of debris in Sun orbit	8					8
TOTALS	498	3	3	1	67	572
Objects decayed or de-orbited	237				496	733

* Soviets claim Lunik 4, formerly in Earth-Moon orbit, is now in Sun orbit (WIR 51/64); claim may be true but cannot be verified.

A listing of Soviet payloads and their orbital parameters is shown on page 42.

(SPADATS)
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Cosmos 60, Apparent Lunar Probe Failure, Decays and Re-enters

Cosmos 60, which the Soviets launched 12 March, has suffered natural orbital decay, having re-entered the Earth's atmosphere during Revolution 85 on 17 March.

The Soviets announced that this vehicle was participating in the standing Cosmos program of investigating the near-Earth space environment and the Earth's cloud cover. However, all indications are that the vehicle was a lunar probe which failed to be injected into a transfer trajectory toward the Moon. It apparently accomplished no mission other than achieving orbit. (SPADATS, NORAD)

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Voskhod 2 a Step Toward Several Important Space Missions

The Voskhod 2 flight of 18-19 March became an important achievement for the Soviets' space program when Colonel Leonov emerged from the spacecraft and moved about in space for about 10 minutes while tethered to his vehicle. This practice in leaving the craft and moving about in space is a necessary, early preliminary to the:

- Erection of space stations -- which may figure prominently in Soviet plans for manned scientific and military programs in near and deep space.
- Resupply and change of crews of these orbiting laboratories and space platforms of the distant future.
- Performance of spacecraft repair from outside.
- Development of a capability for inspecting orbiting spacecraft.

Details of the Soviets' acknowledged difficulties in de-orbiting Voskhod 2 are not known. However, radar signature analysis by SPADATS indicates that, though the Soviet craft was stable on Revolutions 1 and 2, it was rotating later at least some of the time -- specifically, at least, during Orbits 5, 6, 7, 11, 12, and 16. The period of rotation varied from one rpm to one rotation in 4 minutes. The length of the period appearing to be controlled by varying the distance between 2 rotating bodies protruding from or possibly attached to the vehicle, in the same manner that figure skaters and ballet dancers increase or decrease the rapidity of their spins by moving their arms closer to their bodies or by extending them. The rotation, which might have been connected with thermal control, may not have been stopped in time for the scheduled de-orbit.

Launch. Voskhod 2 was launched from Tyuratam at about 0700Z, 18 March. Its orbital parameters have been announced as follows:

	By SPADATS	By TASS
Equatorial inclination	64.79 degrees	65 degrees
Period	90.91 minutes	90.8 minutes

Apogee	473.17 kilometers (255 n.m.)	495 kilometers (266 n.m.)
Perigee	168.64 kilometers (89.5 n.m.)	173 kilometers (93 n.m.)

The TASS announcement was unusually prompt, coming less than an hour after launch -- before completion of the Zero Orbit. It said that two cosmonauts were aboard, and it gave the time of launch, which is not usual for TASS.

Propulsion. The vehicle seems to have been powered by the same system used for Voskhod 1, that is, it apparently was launched by the SS-6 ICBM booster/sustainer and injected into orbit by the heavy Venik upper stage.

50X1 and 3, E.O.13526

Radar Signature Analysis. Analysis by SPADATS indicates a radar cross-section of 99.7 square meters for the Voskhod, which apparently was about 12 feet long and 6 feet in diameter. A total of 7 bodies was detected in connection with this event: the payload, the Venik rocket body (about 30 feet long and 9 feet in diameter, according to radar signature analysis), and 5 fragments. Four of the fragments were relatively small, but one was about 6 feet long and 2.5 feet in diameter.

De-Orbit. SPADATS estimates that Voskhod 2 landed at about 0852Z-0857Z.

Prospects. TASS has said that the USSR plans to have a cosmonaut leave an orbiting vehicle and move about untethered in space. This the Soviets could possibly attempt later this year.
(SPADATS; various ELINT sensors; NORAD)
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Soviets Claim Lead in Fluid Control; Could Make Space Payloads More Reliable

A leading Soviet scientist claims that his nation is ahead of the West in the development of fluid (hydraulic and pneumatic) control devices, which hold promises of contributing to the reliability of instrumentation and control systems of space vehicles. Soviets who have discussed fluid control

have reported mainly on industrial applications, but it can be presumed that space applications would come first. Fluid control systems reportedly are ready to be placed in high-rate production in the USSR.
(FTD)
~~(SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to NATO, Aus & NZ)

(Begin UNCLASSIFIED) Fluid control devices perform much the same functions as electronic devices, such as amplification and switching. Instead of a flow of electricity through a maze of wires, fluids are forced through a maze of hollow channels. They can be used to build amplifiers, decision-making devices, computers, and control systems.

Fluid control devices will not, as a rule, replace electronic control devices. Though they have a certain potential for miniaturization, they tend to be larger and heavier than electronic devices; also, they are slower and less versatile. However, they do have certain advantages which favor them for use in space-payload instrumentation:

- They are more reliable than electronic devices when subjected to physical vibration (as in powered flight), extremes of temperatures, and ionizing radiation.
- They can be energized by almost any type of power source.
- They are cheaper because they are of simple construction and can be fabricated from inexpensive materials.

Some mechanical control devices may also be replaced by fluid systems, which, since they have few or no moving parts, are more reliable. For example, they might replace the jet vanes and swiveled nozzles presently used to steer rockets in flight. The vanes and swiveled nozzles are less than ideal, since they respond slowly, much force is needed to operate them, and their moving parts may be put out of action by the hot exhaust gases.
(NORAD)
(UNCLASSIFIED)

Soviets Confident That Problems of Manned Interplanetary Flights Will Be Solved

Recent Soviet press items indicate that Soviet authorities are confident that the problems involved in manned interplanetary flights will eventually be solved.

In an article, "Rockets for Interplanetary Flights," which appeared in the 7 January 1965 issue of Red Star, Major General T. Melkumov said: "The experience of Soviet rocket builders accumulated in the 7 years since launch of the world's first Earth satellite, the remarkable successes of space

science and technology, and our country's achievements in this comparatively short period, are added guarantees that the problem of manned flight into the depths of space, notwithstanding its grandiosity and complexity, will be solved." Melkumov signed his article as a major general of Engineer-Technical Services and Distinguished Worker of Science and Technology.

In an interview published in the 7 March issue of Red Star, and entitled, "Can Man Live Beyond the Bounds of the Planet?" V. V. Parin states, "Even today, we can say with complete assurance that science and technology, by their steady development, will enable space voyages lasting months and even years. I am sure that there will be such flights." Parin is a prominent Soviet physiologist and Vice President of the Soviet Academy of Medical Sciences. In his interview, Parin was commenting on statements made in the French magazine "Express" to the effect that man cannot withstand the space environment more than 5 days and, therefore, will never leave the Earth's vicinity.

(Red Star)
(UNCLASSIFIED)

Soviet Space Vehicle Listing, as of 22 March 1965

Soviet Vehicles in Earth Orbit

Soviet Designation	Object No.	Date of Launch	Inclination to Equator (degrees)	Period (minutes)	Apogee (kilometers)	Perigee (kilometers)	Estimated Life Expectancy or Decay Date
Cosmos 17	580	22 May 63	49.00	94.90	514.52	250.05	Jul 65
Polyot 1	683	01 Nov 63	58.86	102.48	875.26	329.08	Over 50 yrs
Electron 1	746	30 Jan 64	60.83	169.32	7,139.2	409.7	Over 50 yrs
Electron 2	748	30 Jan 64	60.82	1,346.6	64,018.0	468.0	Over 50 yrs
Polyot 2	784	12 Apr 64	58.11	92.40	493.1	319.4	Over 5 years
Electron 3	829	10 Jul 64	60.80	168.2	7,026.2	402.7	Over 50 yrs
Electron 4	830	10 Jul 64	60.80	1,313.9	66,260.1	458.4	Over 50 yrs
Cosmos 41	869	22 Aug 64	64.88	714.6	39,782.4	414.7	Over 50 yrs
Cosmos 42	864	22 Aug 64	48.93	98.19	1,142.6	229.4	2d Qr, 66
Cosmos 43	867	22 Aug 64	48.96	98.07	1,124.6	228.4	2d Qr 1966
Cosmos 44	876	28 Aug 64	65.01	99.48	821.7	663.2	Over 50 yrs
Cosmos 49	913	24 Oct 64	48.95	91.90	472.4	260.1	Oct 65
Cosmos 51	947	09 Dec 64	48.70	92.48	557.8	258.7	1967
Cosmos 53	983	30 Jan 65	48.6	97.76	1,110.5	227.6	1967
Cosmos 54	1089	21 Feb 65	56.04	104.95	1,726.3	258.20	Over 5 yrs
Cosmos 55	1090	21 Feb 65	56.02	105.25	1,752.3	260.70	Over 5 yrs
Cosmos 56	1091	21 Feb 65	56.03	104.54	1,688.2	258.49	Over 5 yrs
Cosmos 58	1097	26 Feb 65	65.02	96.77	649.23	560.38	Over 50 yrs
Cosmos 61	1267	15 Mar 65	56.00	105.12	1,739.2	261.15	Over 5 yrs
Cosmos 62	1268	15 Mar 65	56.03	104.80	1,712.6	258.25	Over 10 yrs
Cosmos 63	1269	15 Mar 65	56.02	104.40	1,676.2	257.42	Over 5 yrs

Soviet Space Probes

			Inclination to Ecliptic (degrees)	Period (days)	Aphelion (AUs)*	Perihelion (AUs)*	
Lunik 1	112	02 Jan 59	00.01	449.5	1.315 AU	.9766 AU	Indefinite
Lunik 2		12 Sep 59	Not applicable -- impacted on Moon				
Venus 1	80	12 Feb 61	00.58	300.	1.019 AU	.7183 AU	Indefinite
Mars 1	450	01 Nov 62	2.683	519.1	1.603 AU	.9237 AU	Indefinite
Lunik 4	566	02 Apr 63	Not computed -- possibly in barycentric orbit				Indefinite
Zond 1	785	02 Apr 64	Not available				Indefinite
Zond 2	945	30 Nov 64		512.	1.54 AU	.9840 AU	Indefinite

*AU -- astronomical units. Roughly, 1 AU = 93 million statute miles (mean distance from Sun to Earth).

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